



AH174

Inverted Output Hall Effect Latch For High Temperature

■ Features

- Bipolar Hall effect latch sensor
- 3.5V to 20V DC operation voltage
- Open collector pre-driver
- 25mA output sink current
- Chip power reverse-connection protection
- Operating temperature: $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$
- Package: SIP3, SOT23

■ Applications

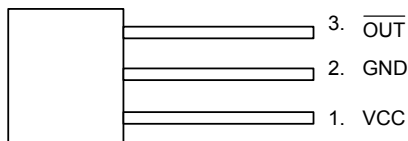
- Rotor position sensing
- Current switch
- Encoder
- RPM detection

■ General Description

AH174 is a single-digital-output Hall-effect sensor for high temperature operation. The device includes an on-chip Hall voltage generator for magnetic sensing, an amplifier to amplify Hall voltage, and a comparator to provide switching hysteresis for noise rejection, and an open-collector output pre-driver. An internal bandgap regulator is used to provide temperature compensated supply voltage for internal circuits and allows a wide operating supply range. While the magnetic flux density (B) is larger than threshold B_{op} , the $\overline{\text{OUT}}$ pin turns off (High). If B removed toward B_{rp} , the $\overline{\text{OUT}}$ pin is latched "off" state prior to $B < B_{rp}$. When $B < B_{rp}$, the $\overline{\text{OUT}}$ pin go into "on" state.

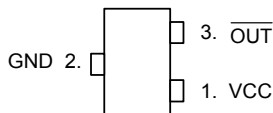
■ Pin Assignment

(Top view)



(SIP3 package)

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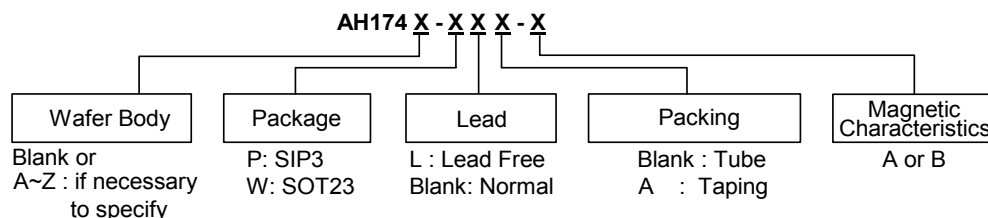


(SOT23 package)

■ Pin Descriptions

Name	Description
VCC	Input power
GND	Ground
$\overline{\text{OUT}}$	Inverted output stage

■ Ordering Information



The diagram illustrates a PWM motor speed control system. It begins with a VCC supply connected to a diode and a REG. (regulator) block. The output of the REG. block is connected to a summing junction (represented by a square with an 'X'). The summing junction also receives feedback from the output. The output of the summing junction is connected to the non-inverting input (+) of an AMP (amplifier) block. The output of the AMP is connected to the input of a comparator block (represented by a triangle with a square wave symbol). The output of the comparator is connected to the base of a transistor. The emitter of the transistor is connected to GND, and the collector is connected to the output, labeled OUT. The ground connection is labeled GND.

The diagram illustrates the internal connections of a Hall Motor Driver. A central block labeled "Driver & Control Logic" is connected to a "Three Phase Hall Motor" (M) and a "Digital Hall Effect Sensor".

- Driver & Control Logic:** This block has six output pins labeled I_A , I_B , I_C , I_a , I_b , and I_c on its right side. It also has three input pins labeled H_A , H_B , and H_C on its bottom side. A square wave symbol labeled "RPM sensing" is shown between the I_C and H_A lines.
- Three Phase Hall Motor (M):** A circular component with three terminals. It is connected to the I_A , I_B , and I_C pins of the Driver & Control Logic block.
- Digital Hall Effect Sensor:** A small rectangular component with three pins. It is connected to the I_a , I_b , and I_c pins of the Driver & Control Logic block.

Legend:

- Digital Hall Effect Sensor
- M: Three Phase Hall Motor

Hall Motor Driver

Rev 0.7 May 7, 2004



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■ Absolute Maximum Ratings (at Ta= 25°C)

Characteristics		Symbol	Rating	Unit
Supply voltage		VCC	20	V
Output “off ” voltage		V _{out (off)}	20	V
Output “on” current		I _{o (sink)}	25	mA
Operating Temperature range		T _{opt}	-40~+125	°C
Storage Temperature range		T _{stg}	-65~+150	°C
Power Dissipation	SIP	PD	550	mW
	SOT23		230	mW

■ Electrical Characteristics (Ta= 25°C)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage	Vcc	—	3.5	-	20	V
Output saturation voltage	V _{out(sat)}	VCC=12V, $\overline{\text{OUT}}$ "ON" I _o =10mA	-	300	400	mV
Supply current	I _{cc}	VCC=12V, $\overline{\text{OUT}}$ "OFF"	-	3.5	6	mA

■ Magnetic Characteristics (Ta= 25°C)

(1mT = 10 Gauss)

A grade

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operate Point	B _{op}	15	-	60	Gauss
Release Point	B _{rp}	-60	-	-15	Gauss
Hysteresis	B _{hy}	-	80	-	Gauss

B grade

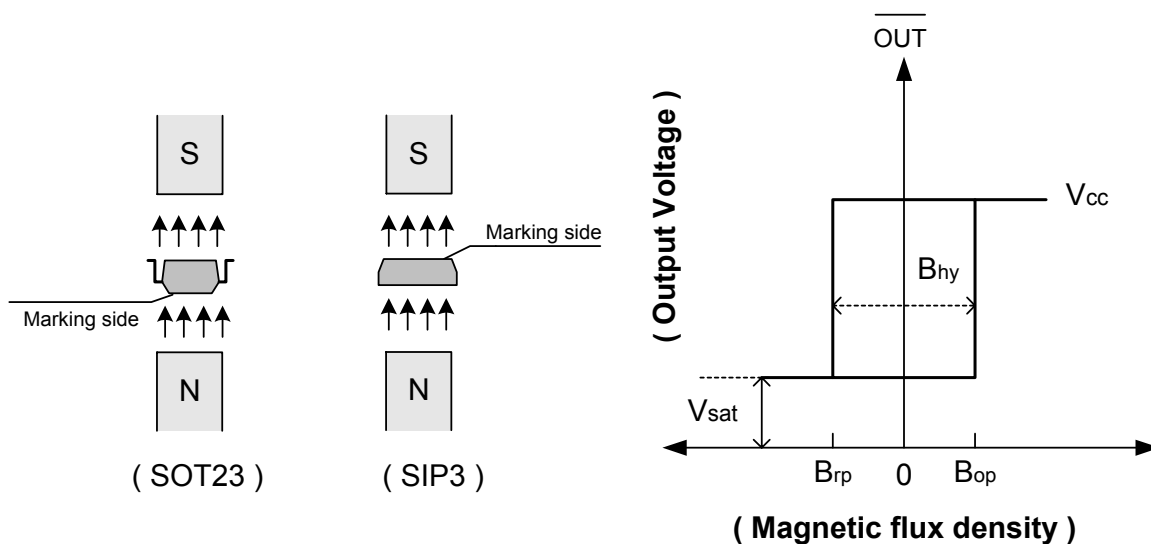
Parameter	Symbol	Min.	Typ.	Max.	Unit
Operate Point	B _{op}	5	-	80	Gauss
Release Point	B _{rp}	-80	-	-5	Gauss
Hysteresis	B _{hy}	-	80	-	Gauss



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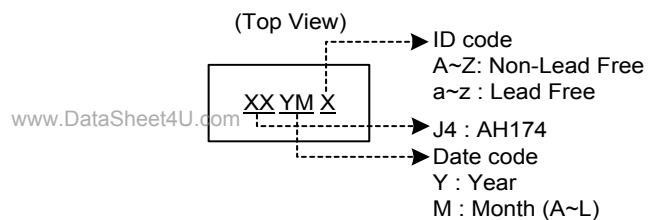
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■ Operating Characteristics

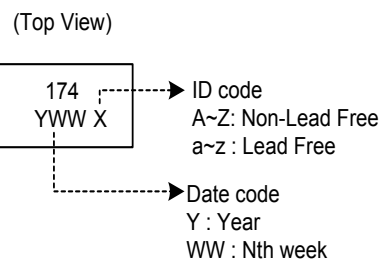


■ Marking Information

(1) SOT23



(2) SIP3



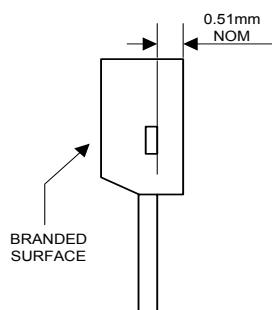


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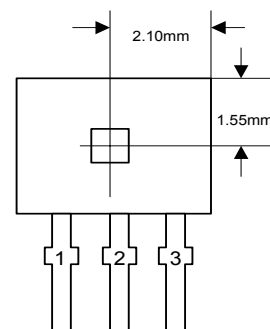
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■ Package Information

(1) Package Type: SIP-3L

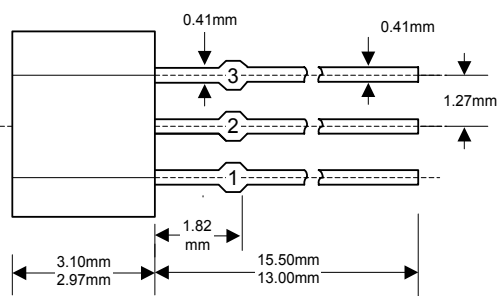
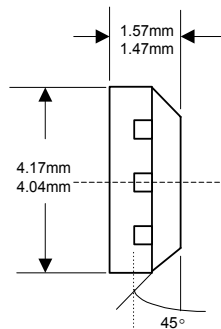
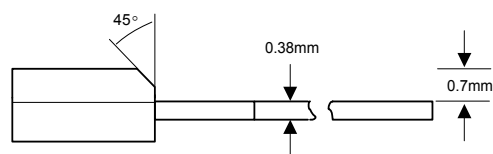


Active Area Depth



Sensor Location

Package Dimension



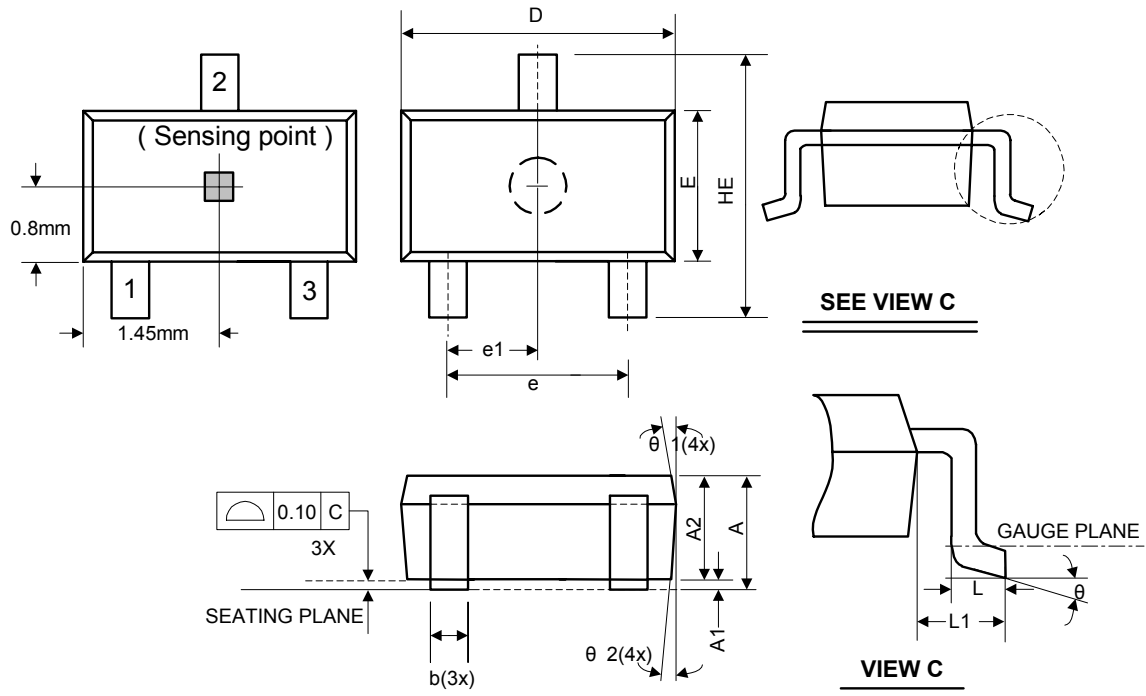
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(2) Package Type: SOT23-3L



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.05	-	1.35	0.041	-	0.053
A1	0.05	-	0.15	0.002	-	0.006
A2	1.00	1.10	1.20	0.039	0.043	0.047
b	0.25	-	0.50	0.010	-	0.020
C	0.08	-	0.20	0.003	-	0.008
D	2.70	2.90	3.00	0.106	0.114	0.118
E	1.50	1.60	1.70	0.059	0.063	0.067
HE	2.60	2.80	3.00	0.102	0.110	0.118
L	0.30	-	0.55	0.012	-	0.022
L1	0.50	0.60	0.70	0.020	0.024	0.028
e	1.80	1.90	2.00	0.071	0.075	0.079
e1	0.85	0.95	1.05	0.033	0.037	0.041
θ	0°	5°	10°	0°	5°	10°
θ1	3°	5°	7°	3°	5°	7°
θ2	6°	8°	10°	6°	8°	10°